## *Technical Data Sheet*

| | |
|---|---|
| Bridge Identification: | 1510210000000B03 |
| Facility Carried: | M 55 |
| Feature Intersected: | Pine River |
| Location: | Norman Township |
| County: | Manistee |
| Region: | North |
| Year Built: | 1934 |
| Year Reconstructed: | 1989, 1990 |
| Bridge Type: | Cantilever Deck Truss |
| No. of Spans: | 5 |
| Deck Area: | 24,249 S.F. |
| Paint System: | Type 4 |
| Paint Area: | 84,000 S.F. |
| Comments: | Historic Structure |

Plan View Looking East (1)

South Elevation (2)

| Fracture Critical Members |
|---|
| 1. Tie-down Members at Abutments<br>2. Truss Tension Members<br>3. Truss Joints |

| Fatigue Sensitive Details |
|---|
| 1. Welded Cover Plates at Floor Beams<br>2. Tack Welds |

## *General Bridge Description*

Bridge B03 of 51021, also known as the Cooley Bridge, is a five-span, steel, continuous deck truss bridge carrying Michigan State Route 55 over the Pine River in Norman township in Manistee County. The three deck truss spans measure 125'-0", 300'-0", and 125'-0" from west to east. Behind each abutment backwall is a 43'-0" reinforced concrete tee beam span, making the overall length of the bridge 641'-0". The out-to-out width of the deck is 31'-10", providing for two 12'-0" travel lanes with a 3'-0" shoulder and a 3'-0" sidewalk along each edge of the roadway. The bridge is supported by reinforced concrete abutments and solid shaft piers.

The floor system is comprised of longitudinal stringers and transverse floorbeams, which frame into the two deck trusses along either edge of the bridge. Span 2 contains a 50'-0" suspended span supported by seated assemblies at the end of the trusses cantilevered from Spans 1 and 3. Tie-down assemblies consisting of steel pin and link members anchor the trusses at the abutments.

Plan View (3)

Elevation View (4)

The bridge was built in 1934 and was honored by the American Institute of Steel Construction as the "Most Beautiful Steel Bridge" in 1935. The bridge was rehabilitated in 1989, when the tie-down pin and link assemblies were replaced, and was painted in 1990. The Cooley Bridge is a twin of Bridge B01 of 49023 (U.S. 2 over Cut River).


AISC Award Plaque (5)

## *Inspection Checklists*

For additional information and detailed inspection procedures, refer to the Inspection and Maintenance Program section of this manual.

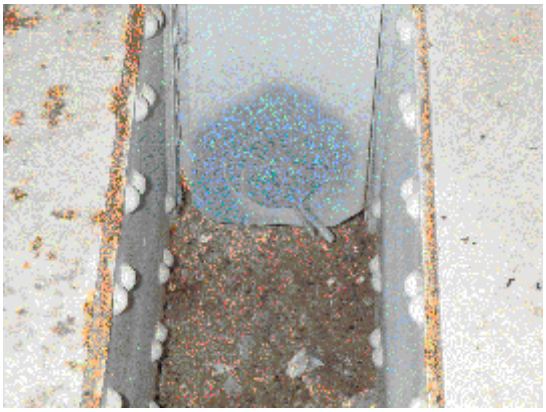
### *Fracture-Critical Members/Fatigue-Sensitive Details*

! **Tie-down members at abutments.** These pin and link assemblies (Photos 6 and 7) serve to anchor the trusses in Spans 1 and 3. They should be carefully inspected for cracks and loss of section and to ensure they are free to move as intended.

Typical Tie-down Top Pin at Abutment. Note Pack Rust between Floorbeam and Lateral Brace Gusset (6)

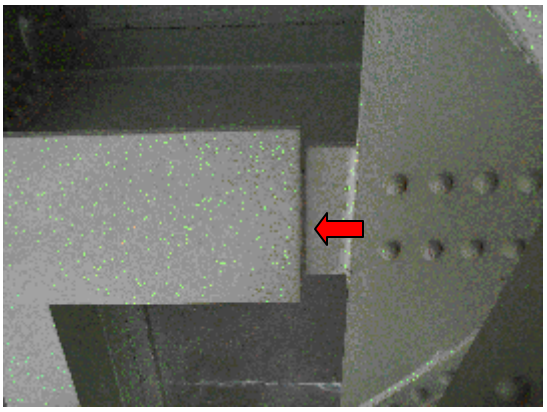
Overall View of Typical Tie-down (7)

The bottom portion of the tie-down assembly is embedded in the abutment concrete. The resulting box configuration tends to accumulate dirt and debris that trap moisture. Check for corrosion and any associated section loss on these members at the abutment interface.



Typical Accumulation of Debris at Bottom of Tie-down (8)

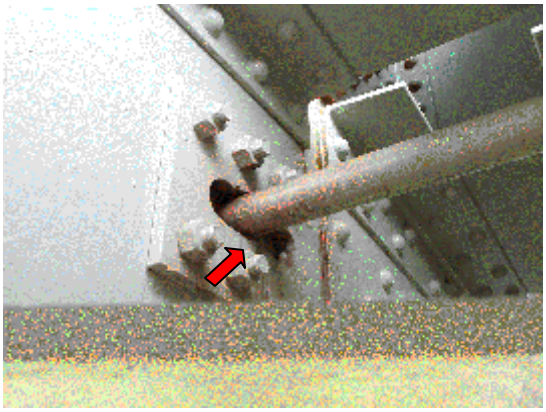
! **Welded cover plates on floorbeams.** These cover plates were added to the bottom flanges of the floorbeams during the rehabilitation. The terminations of the welds at the ends of the cover plates should be inspected carefully.



Typical Welded Bottom Flange Cover Plate (9)

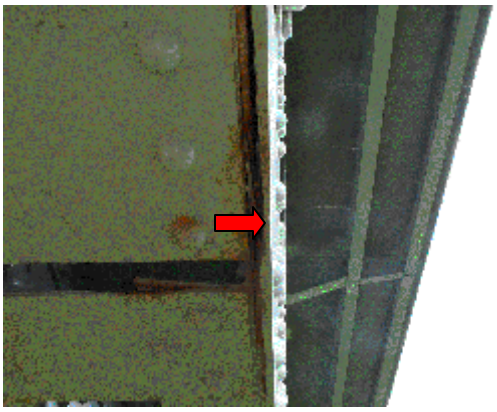
! **Truss Joints L10 and L12.** (Photos 10 and 11) The pins in the false chords at these locations in both trusses were replaced during the rehabilitation because of extensive saw-cutting action from the chords. The new pins should be monitored for similar problems. Also, the gusset plates on both trusses should be examined for surface rust and any associated section loss and pack rust between plates. These areas should be monitored closely.

Typical Lower Chord Gusset Plate (10)

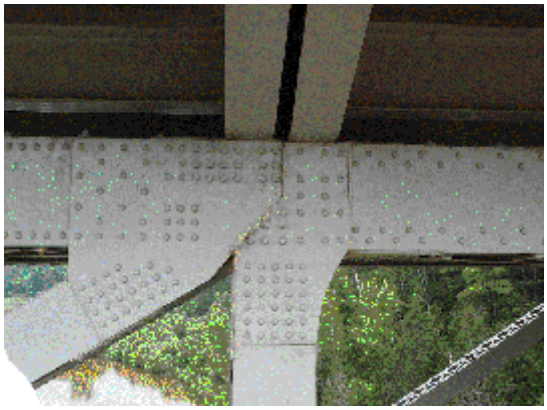


Worn False Chord Pin Slot. L10 North shown.
Note that Pin is in Contact with Pin Plate. (11)

! **Truss Joints.** (Photos 12 and 13) The truss joints are made up of large gusset plates that connect the truss members. These joints, with their layers of plates, are susceptible to development of pack rust or crevice corrosion. The joints should be inspected closely for pack rust formation and associated loss of section in the gusset plates or members. The gusset plates on the suspended span truss joints and the pins should be inspected for proper alignment and clearances and for possible wear caused by their rubbing together under live load.



Section Loss at Truss Joint Gusset Plate (12)



Typical Upper Chord Gusset Plate (13)

! **Truss tension members.** Truss tension members should be considered fracture-critical and should receive a careful inspection for section loss and cracks. To distinguish tension members from compression members, an analysis should be done by a structural engineer. The members of concern could be top or bottom chords, diagonals, or verticals.

! **Tack welds on gusset plates, truss members, or floor system members.** Monitor closely for cracks. If any cracks are found, they should be removed by grinding. Test ultrasonically to ensure that the cracks have been completely removed.

***Other***

! **Truss false chord pins.** The bottom chords of the suspended span in the truss have pinned connections to the cantilevered trusses at either end. These pins should be carefully inspected for wear.

! **Wind tongue assemblies on end floorbeams.** These members should be monitored for section loss. The members are wide-flange, steel sections with their webs oriented horizontally. This

configuration allows the webs to hold moisture.

! **Reinforced concrete tee beam end spans.** These spans are accessible through manholes in the sidewalks at either end of the bridge or through doors in the abutment backwalls. These areas qualify as confined spaces and appropriate safety procedures should be followed. The concrete should be inspected for cracking, spalling, and general condition.

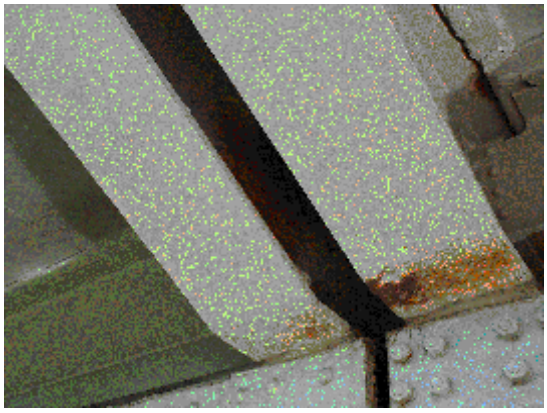
Tee Beam End Span (14)

! **Drainage systems at abutments.** The drainage systems at the abutments are a potential maintenance problem. There are several bends and changes in direction of the downspouts, which can lead to accumulation of debris inside the pipes. Also, check for erosion, which may indicate a leak in the system.

Drainage System at East Abutment (15)

! **Joints U10 and U12.** (Photos 16 and 17) The floorbeams at these locations are framed closely i the and not pai pro Als the for sus spa o f tru t c b n p o o b t p n t

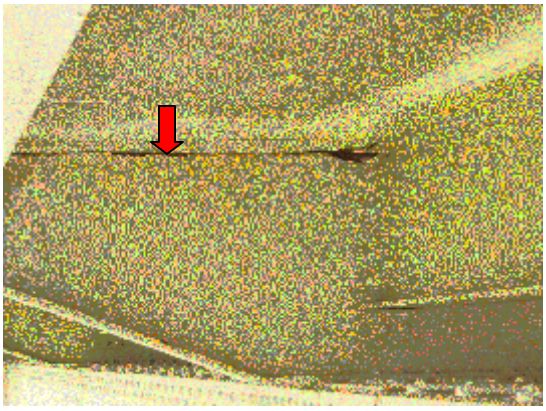
South Top Chord at U10 (16)



Rusted Floorbeam at U10, South Side (17)

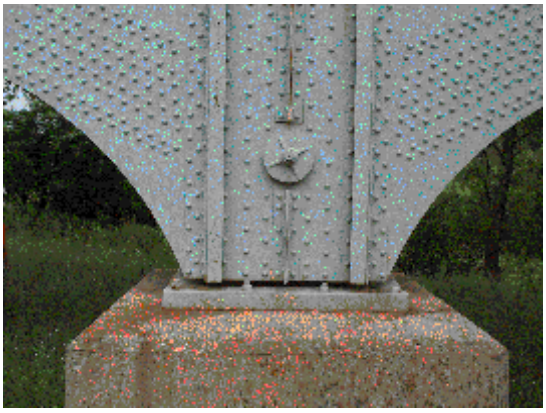
ss are enclosed in box members at this location. These areas should be carefully inspected for development of corrosion and section loss.

! **Floorbeam top flanges.** The cold joints in the deck are susceptible to leaking, allowing corrosion to form on the top flanges of the floorbeams. These flanges should be monitored for deterioration.



Typical Rust on Top Flange of Floorbeam at Leaking Cold Joint (18)

! **Truss bearings at piers.** Inspect the truss bearing assemblies (Photos 19 and 20), especially the pins, at the piers for signs of unusual wear or cracks. Inspect to ensure they are free to move as intended.



Typical Truss Bearing at Pier - Elevation View (19)

Typical Truss Bearing at Pier - End View (20)

## *Maintenance Recommendations*

### *Regularly Scheduled Maintenance Items*

| Recommendation | Schedule |
|---|---|
| Clean bridge drainage system components (deck drains and downspouts). | 6 to 12 months |
| Flush bridge deck joints and check for leaks. | 12 months |
| Powerwash bridge superstructure. | 12 months |
| Powerwash bearings and pin and hanger assemblies.<br>Powerwash pins at false chord locations. | 12 months |